

Project: Cummins
 Site: AB Section 32
 Well: Westerman A5-736
 Wellbore: Wellbore #1
 Design: Plan #1



Noble Energy

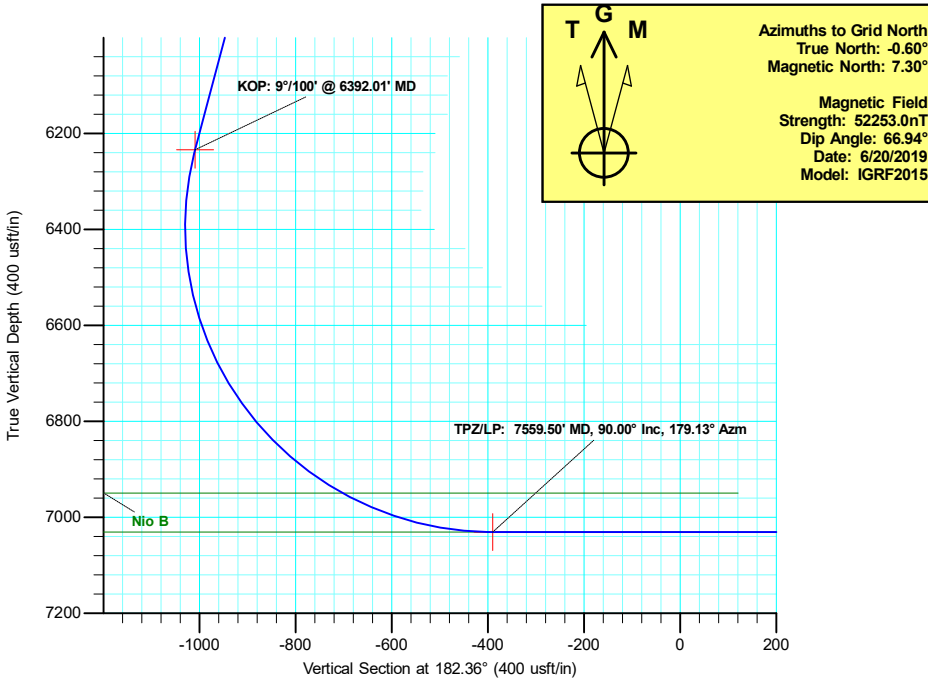
Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Northern Zone
 System Datum: Mean Sea Level

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00	
3	2823.44	16.47	335.67	2812.15	107.09	-48.42	2.00	335.67	-105.01	
4	6392.01	16.47	335.67	6234.31	1028.94	-465.16	0.00	0.00	-1008.95	
5	7559.50	90.00	179.13	7031.00	412.87	-549.56	9.00	-155.65	-389.94	TPZ-Westerman A5-736
6	17618.82	90.00	179.13	7031.00	-9645.29	-396.70	0.00	0.00	9653.45	BHL-Westerman A5-736

WELL DETAILS: Westerman A5-736

+N/-S	+E/-W	Northing	Ground Level: Easting	4815.00 Latitude	Longitude
0.00	0.00	1439069.87	3258883.16	40.534915	-104.568601

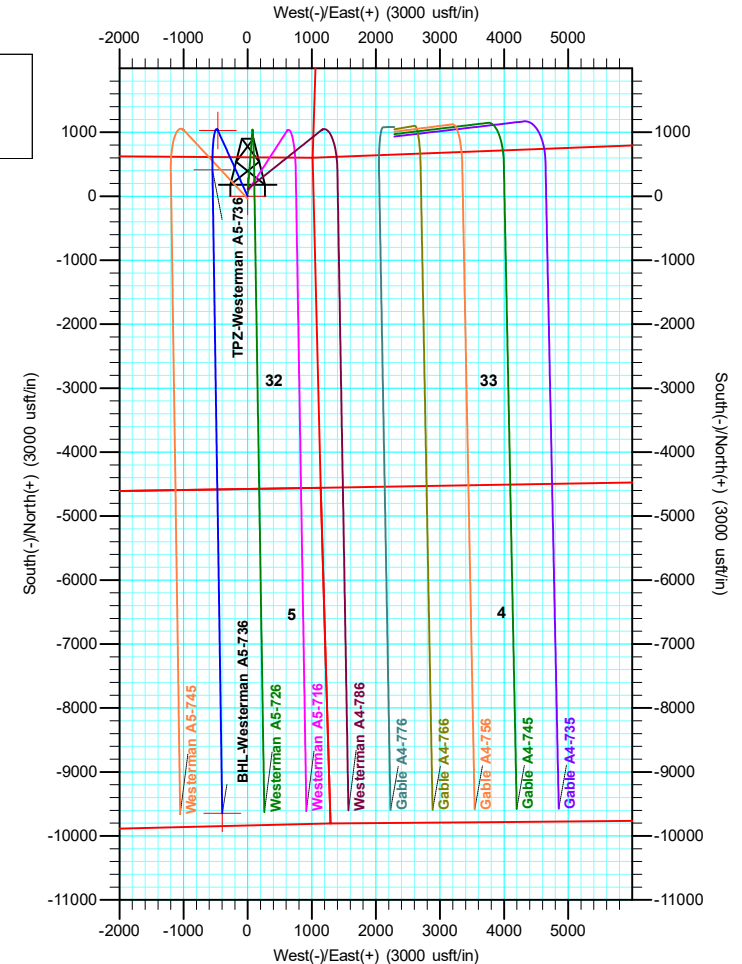
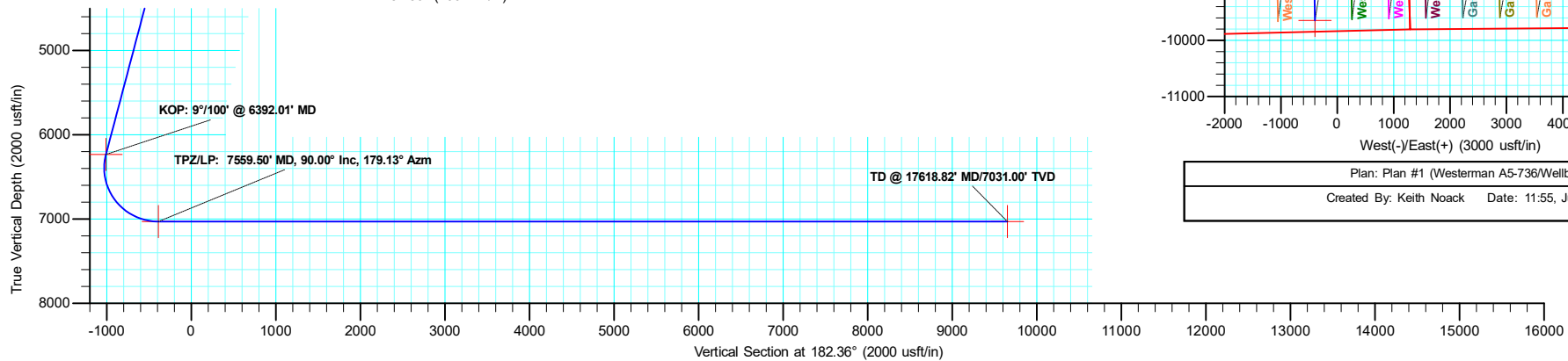


T G M

Azimuths to Grid North
 True North: -0.60°
 Magnetic North: 7.30°

Magnetic Field
 Strength: 52253.0nT
 Dip Angle: 66.94°
 Date: 6/20/2019
 Model: IGRF2015

SHL: 609 FNL/ 1028 FEL Sec. AB32
 TPZ: 200 FNL/ 1568 FEL Sec. AB32
 BHL: 200 FSL/ 1683 FEL Sec. A5



Plan: Plan #1 (Westerman A5-736/Wellbore #1)
 Created By: Keith Noack Date: 11:55, June 21 2019



Noble Energy

**Cummins
AB Section 32
Westerman A5-736**

Wellbore #1

Plan: Plan #1

Standard Planning Report

21 June, 2019

Database:	Local	Local Co-ordinate Reference:	Well Westerman A5-736
Company:	Noble Energy	TVD Reference:	KB @ 4845.00usft
Project:	Cummins	MD Reference:	KB @ 4845.00usft
Site:	AB Section 32	North Reference:	Grid
Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Project	Cummins, Weld County Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	AB Section 32				
Site Position:		Northing:	1,437,026.14 usft	Latitude:	40.529357
From:	Lat/Long	Easting:	3,257,086.37 usft	Longitude:	-104.575142
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.60 °

Well	Westerman A5-736					
Well Position	+N/-S	2,043.73 usft	Northing:	1,439,069.87 usft	Latitude:	40.534915
	+E/-W	1,796.79 usft	Easting:	3,258,883.16 usft	Longitude:	-104.568602
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	4,815.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/20/2019	7.90	66.94	52,253.02450632

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	182.36

Plan Survey Tool Program	Date	6/20/2019			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	17,618.82	Plan #1 (Wellbore #1)	2_MWD+IFR1+MS A008Mb: IFR dec & multi-st	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,823.44	16.47	335.67	2,812.15	107.09	-48.42	2.00	2.00	0.00	335.67	
6,392.01	16.47	335.67	6,234.31	1,028.94	-465.16	0.00	0.00	0.00	0.00	
7,559.50	90.00	179.13	7,031.00	412.87	-549.56	9.00	6.30	-13.41	-155.65	TPZ-Westerman A5
17,618.82	90.00	179.13	7,031.00	-9,645.29	-396.70	0.00	0.00	0.00	0.00	BHL-Westerman A5

Database:	Local	Local Co-ordinate Reference:	Well Westerman A5-736
Company:	Noble Energy	TVD Reference:	KB @ 4845.00usft
Project:	Cummins	MD Reference:	KB @ 4845.00usft
Site:	AB Section 32	North Reference:	Grid
Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SHL-Westerman A5-736									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Build: 2°/100' @ 2000.00' MD									
2,100.00	2.00	335.67	2,099.98	1.59	-0.72	-1.56	2.00	2.00	0.00
2,200.00	4.00	335.67	2,199.84	6.36	-2.87	-6.24	2.00	2.00	0.00
2,300.00	6.00	335.67	2,299.45	14.30	-6.46	-14.02	2.00	2.00	0.00
2,400.00	8.00	335.67	2,398.70	25.40	-11.48	-24.91	2.00	2.00	0.00
2,500.00	10.00	335.67	2,497.47	39.66	-17.93	-38.89	2.00	2.00	0.00
2,600.00	12.00	335.67	2,595.62	57.04	-25.79	-55.94	2.00	2.00	0.00
2,700.00	14.00	335.67	2,693.06	77.54	-35.05	-76.03	2.00	2.00	0.00
2,800.00	16.00	335.67	2,789.64	101.12	-45.72	-99.16	2.00	2.00	0.00
2,823.44	16.47	335.67	2,812.15	107.09	-48.42	-105.01	2.00	2.00	0.00
Hold: 16.47° Inc, 335.67° Azm									
2,900.00	16.47	335.67	2,885.57	126.87	-57.36	-124.41	0.00	0.00	0.00
3,000.00	16.47	335.67	2,981.46	152.70	-69.03	-149.74	0.00	0.00	0.00
3,100.00	16.47	335.67	3,077.36	178.54	-80.71	-175.07	0.00	0.00	0.00
3,200.00	16.47	335.67	3,173.26	204.37	-92.39	-200.40	0.00	0.00	0.00
3,300.00	16.47	335.67	3,269.16	230.20	-104.07	-225.73	0.00	0.00	0.00
3,400.00	16.47	335.67	3,365.05	256.03	-115.75	-251.06	0.00	0.00	0.00
3,500.00	16.47	335.67	3,460.95	281.87	-127.43	-276.39	0.00	0.00	0.00
3,600.00	16.47	335.67	3,556.85	307.70	-139.10	-301.72	0.00	0.00	0.00
3,700.00	16.47	335.67	3,652.75	333.53	-150.78	-327.05	0.00	0.00	0.00
3,800.00	16.47	335.67	3,748.64	359.36	-162.46	-352.38	0.00	0.00	0.00
3,900.00	16.47	335.67	3,844.54	385.19	-174.14	-377.71	0.00	0.00	0.00
4,000.00	16.47	335.67	3,940.44	411.03	-185.82	-403.04	0.00	0.00	0.00
4,100.00	16.47	335.67	4,036.34	436.86	-197.49	-428.37	0.00	0.00	0.00
4,200.00	16.47	335.67	4,132.23	462.69	-209.17	-453.70	0.00	0.00	0.00
4,300.00	16.47	335.67	4,228.13	488.52	-220.85	-479.03	0.00	0.00	0.00
4,400.00	16.47	335.67	4,324.03	514.36	-232.53	-504.37	0.00	0.00	0.00
4,500.00	16.47	335.67	4,419.93	540.19	-244.21	-529.70	0.00	0.00	0.00
4,600.00	16.47	335.67	4,515.82	566.02	-255.89	-555.03	0.00	0.00	0.00
4,700.00	16.47	335.67	4,611.72	591.85	-267.56	-580.36	0.00	0.00	0.00
4,800.00	16.47	335.67	4,707.62	617.68	-279.24	-605.69	0.00	0.00	0.00

Database:	Local	Local Co-ordinate Reference:	Well Westerman A5-736
Company:	Noble Energy	TVD Reference:	KB @ 4845.00usft
Project:	Cummins	MD Reference:	KB @ 4845.00usft
Site:	AB Section 32	North Reference:	Grid
Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,900.00	16.47	335.67	4,803.52	643.52	-290.92	-631.02	0.00	0.00	0.00
5,000.00	16.47	335.67	4,899.41	669.35	-302.60	-656.35	0.00	0.00	0.00
5,100.00	16.47	335.67	4,995.31	695.18	-314.28	-681.68	0.00	0.00	0.00
5,200.00	16.47	335.67	5,091.21	721.01	-325.96	-707.01	0.00	0.00	0.00
5,300.00	16.47	335.67	5,187.11	746.85	-337.63	-732.34	0.00	0.00	0.00
5,400.00	16.47	335.67	5,283.00	772.68	-349.31	-757.67	0.00	0.00	0.00
5,500.00	16.47	335.67	5,378.90	798.51	-360.99	-783.00	0.00	0.00	0.00
5,600.00	16.47	335.67	5,474.80	824.34	-372.67	-808.33	0.00	0.00	0.00
5,700.00	16.47	335.67	5,570.70	850.17	-384.35	-833.66	0.00	0.00	0.00
5,800.00	16.47	335.67	5,666.59	876.01	-396.02	-858.99	0.00	0.00	0.00
5,900.00	16.47	335.67	5,762.49	901.84	-407.70	-884.32	0.00	0.00	0.00
6,000.00	16.47	335.67	5,858.39	927.67	-419.38	-909.65	0.00	0.00	0.00
6,100.00	16.47	335.67	5,954.28	953.50	-431.06	-934.98	0.00	0.00	0.00
6,200.00	16.47	335.67	6,050.18	979.34	-442.74	-960.31	0.00	0.00	0.00
6,300.00	16.47	335.67	6,146.08	1,005.17	-454.42	-985.64	0.00	0.00	0.00
6,392.01	16.47	335.67	6,234.31	1,028.94	-465.16	-1,008.95	0.00	0.00	0.00
KOP: 9°/100' @ 6392.01' MD - KOP-Westerman A5-736									
6,400.00	15.82	334.59	6,241.99	1,030.95	-466.09	-1,010.93	9.00	-8.17	-13.61
6,450.00	11.90	325.20	6,290.53	1,041.35	-471.96	-1,021.07	9.00	-7.82	-18.77
6,500.00	8.58	307.86	6,339.74	1,047.87	-477.86	-1,027.35	9.00	-6.65	-34.68
6,550.00	6.77	276.40	6,389.31	1,050.49	-483.73	-1,029.72	9.00	-3.63	-62.91
6,600.00	7.63	240.53	6,438.94	1,049.19	-489.55	-1,028.18	9.00	1.74	-71.74
6,650.00	10.54	218.36	6,488.32	1,043.96	-495.28	-1,022.73	9.00	5.81	-44.34
6,700.00	14.29	206.64	6,537.15	1,034.86	-500.89	-1,013.40	9.00	7.50	-23.44
6,750.00	18.38	199.88	6,585.13	1,021.92	-506.34	-1,000.25	9.00	8.17	-13.53
6,800.00	22.61	195.54	6,631.96	1,005.24	-511.60	-983.37	9.00	8.48	-8.68
6,850.00	26.93	192.52	6,677.35	984.92	-516.63	-962.85	9.00	8.64	-6.04
6,900.00	31.30	190.29	6,721.02	961.07	-521.41	-938.83	9.00	8.74	-4.47
6,950.00	35.70	188.55	6,762.70	933.85	-525.90	-911.45	9.00	8.80	-3.47
7,000.00	40.12	187.16	6,802.14	903.42	-530.08	-880.88	9.00	8.84	-2.79
7,050.00	44.55	185.99	6,839.10	869.98	-533.92	-847.31	9.00	8.86	-2.32
7,100.00	48.99	185.00	6,873.34	833.73	-537.40	-810.94	9.00	8.88	-1.98
7,150.00	53.44	184.14	6,904.65	794.89	-540.49	-772.00	9.00	8.90	-1.73
7,200.00	57.89	183.36	6,932.84	753.70	-543.18	-730.74	9.00	8.91	-1.54
7,250.00	62.35	182.66	6,957.74	710.41	-545.46	-687.40	9.00	8.92	-1.40
7,300.00	66.81	182.02	6,979.20	665.30	-547.30	-642.25	9.00	8.92	-1.29
7,350.00	71.28	181.41	6,997.07	618.64	-548.69	-595.57	9.00	8.93	-1.21
7,400.00	75.75	180.84	7,011.26	570.72	-549.63	-547.65	9.00	8.93	-1.14
7,450.00	80.21	180.29	7,021.67	521.83	-550.11	-498.78	9.00	8.94	-1.10
7,500.00	84.68	179.76	7,028.24	472.28	-550.13	-449.27	9.00	8.94	-1.07
7,550.00	89.15	179.23	7,030.93	422.36	-549.69	-399.42	9.00	8.94	-1.06
7,559.50	90.00	179.13	7,031.00	412.87	-549.56	-389.94	9.00	8.94	-1.05
TPZ/LP: 7559.50' MD, 90.00° Inc, 179.13° Azm - TPZ-Westerman A5-736									
7,600.00	90.00	179.13	7,031.00	372.37	-548.94	-349.50	0.00	0.00	0.00
7,700.00	90.00	179.13	7,031.00	272.38	-547.42	-249.66	0.00	0.00	0.00
7,800.00	90.00	179.13	7,031.00	172.39	-545.90	-149.81	0.00	0.00	0.00
7,900.00	90.00	179.13	7,031.00	72.40	-544.38	-49.97	0.00	0.00	0.00
8,000.00	90.00	179.13	7,031.00	-27.58	-542.86	49.87	0.00	0.00	0.00
8,100.00	90.00	179.13	7,031.00	-127.57	-541.34	149.71	0.00	0.00	0.00
8,200.00	90.00	179.13	7,031.00	-227.56	-539.82	249.55	0.00	0.00	0.00
8,300.00	90.00	179.13	7,031.00	-327.55	-538.30	349.39	0.00	0.00	0.00
8,400.00	90.00	179.13	7,031.00	-427.54	-536.78	449.24	0.00	0.00	0.00
8,500.00	90.00	179.13	7,031.00	-527.53	-535.26	549.08	0.00	0.00	0.00
8,600.00	90.00	179.13	7,031.00	-627.51	-533.75	648.92	0.00	0.00	0.00



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Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,700.00	90.00	179.13	7,031.00	-727.50	-532.23	748.76	0.00	0.00	0.00	
8,800.00	90.00	179.13	7,031.00	-827.49	-530.71	848.60	0.00	0.00	0.00	
8,900.00	90.00	179.13	7,031.00	-927.48	-529.19	948.44	0.00	0.00	0.00	
9,000.00	90.00	179.13	7,031.00	-1,027.47	-527.67	1,048.28	0.00	0.00	0.00	
9,100.00	90.00	179.13	7,031.00	-1,127.46	-526.15	1,148.13	0.00	0.00	0.00	
9,200.00	90.00	179.13	7,031.00	-1,227.45	-524.63	1,247.97	0.00	0.00	0.00	
9,300.00	90.00	179.13	7,031.00	-1,327.43	-523.11	1,347.81	0.00	0.00	0.00	
9,400.00	90.00	179.13	7,031.00	-1,427.42	-521.59	1,447.65	0.00	0.00	0.00	
9,500.00	90.00	179.13	7,031.00	-1,527.41	-520.07	1,547.49	0.00	0.00	0.00	
9,600.00	90.00	179.13	7,031.00	-1,627.40	-518.55	1,647.33	0.00	0.00	0.00	
9,700.00	90.00	179.13	7,031.00	-1,727.39	-517.03	1,747.18	0.00	0.00	0.00	
9,800.00	90.00	179.13	7,031.00	-1,827.38	-515.51	1,847.02	0.00	0.00	0.00	
9,900.00	90.00	179.13	7,031.00	-1,927.36	-513.99	1,946.86	0.00	0.00	0.00	
10,000.00	90.00	179.13	7,031.00	-2,027.35	-512.47	2,046.70	0.00	0.00	0.00	
10,100.00	90.00	179.13	7,031.00	-2,127.34	-510.95	2,146.54	0.00	0.00	0.00	
10,200.00	90.00	179.13	7,031.00	-2,227.33	-509.43	2,246.38	0.00	0.00	0.00	
10,300.00	90.00	179.13	7,031.00	-2,327.32	-507.91	2,346.22	0.00	0.00	0.00	
10,400.00	90.00	179.13	7,031.00	-2,427.31	-506.39	2,446.07	0.00	0.00	0.00	
10,500.00	90.00	179.13	7,031.00	-2,527.30	-504.87	2,545.91	0.00	0.00	0.00	
10,600.00	90.00	179.13	7,031.00	-2,627.28	-503.36	2,645.75	0.00	0.00	0.00	
10,700.00	90.00	179.13	7,031.00	-2,727.27	-501.84	2,745.59	0.00	0.00	0.00	
10,800.00	90.00	179.13	7,031.00	-2,827.26	-500.32	2,845.43	0.00	0.00	0.00	
10,900.00	90.00	179.13	7,031.00	-2,927.25	-498.80	2,945.27	0.00	0.00	0.00	
11,000.00	90.00	179.13	7,031.00	-3,027.24	-497.28	3,045.12	0.00	0.00	0.00	
11,100.00	90.00	179.13	7,031.00	-3,127.23	-495.76	3,144.96	0.00	0.00	0.00	
11,200.00	90.00	179.13	7,031.00	-3,227.21	-494.24	3,244.80	0.00	0.00	0.00	
11,300.00	90.00	179.13	7,031.00	-3,327.20	-492.72	3,344.64	0.00	0.00	0.00	
11,400.00	90.00	179.13	7,031.00	-3,427.19	-491.20	3,444.48	0.00	0.00	0.00	
11,500.00	90.00	179.13	7,031.00	-3,527.18	-489.68	3,544.32	0.00	0.00	0.00	
11,600.00	90.00	179.13	7,031.00	-3,627.17	-488.16	3,644.16	0.00	0.00	0.00	
11,700.00	90.00	179.13	7,031.00	-3,727.16	-486.64	3,744.01	0.00	0.00	0.00	
11,800.00	90.00	179.13	7,031.00	-3,827.14	-485.12	3,843.85	0.00	0.00	0.00	
11,900.00	90.00	179.13	7,031.00	-3,927.13	-483.60	3,943.69	0.00	0.00	0.00	
12,000.00	90.00	179.13	7,031.00	-4,027.12	-482.08	4,043.53	0.00	0.00	0.00	
12,100.00	90.00	179.13	7,031.00	-4,127.11	-480.56	4,143.37	0.00	0.00	0.00	
12,200.00	90.00	179.13	7,031.00	-4,227.10	-479.04	4,243.21	0.00	0.00	0.00	
12,300.00	90.00	179.13	7,031.00	-4,327.09	-477.52	4,343.06	0.00	0.00	0.00	
12,400.00	90.00	179.13	7,031.00	-4,427.08	-476.00	4,442.90	0.00	0.00	0.00	
12,500.00	90.00	179.13	7,031.00	-4,527.06	-474.48	4,542.74	0.00	0.00	0.00	
12,600.00	90.00	179.13	7,031.00	-4,627.05	-472.96	4,642.58	0.00	0.00	0.00	
12,700.00	90.00	179.13	7,031.00	-4,727.04	-471.45	4,742.42	0.00	0.00	0.00	
12,800.00	90.00	179.13	7,031.00	-4,827.03	-469.93	4,842.26	0.00	0.00	0.00	
12,900.00	90.00	179.13	7,031.00	-4,927.02	-468.41	4,942.10	0.00	0.00	0.00	
13,000.00	90.00	179.13	7,031.00	-5,027.01	-466.89	5,041.95	0.00	0.00	0.00	
13,100.00	90.00	179.13	7,031.00	-5,126.99	-465.37	5,141.79	0.00	0.00	0.00	
13,200.00	90.00	179.13	7,031.00	-5,226.98	-463.85	5,241.63	0.00	0.00	0.00	
13,300.00	90.00	179.13	7,031.00	-5,326.97	-462.33	5,341.47	0.00	0.00	0.00	
13,400.00	90.00	179.13	7,031.00	-5,426.96	-460.81	5,441.31	0.00	0.00	0.00	
13,500.00	90.00	179.13	7,031.00	-5,526.95	-459.29	5,541.15	0.00	0.00	0.00	
13,600.00	90.00	179.13	7,031.00	-5,626.94	-457.77	5,641.00	0.00	0.00	0.00	
13,700.00	90.00	179.13	7,031.00	-5,726.93	-456.25	5,740.84	0.00	0.00	0.00	
13,800.00	90.00	179.13	7,031.00	-5,826.91	-454.73	5,840.68	0.00	0.00	0.00	
13,900.00	90.00	179.13	7,031.00	-5,926.90	-453.21	5,940.52	0.00	0.00	0.00	
14,000.00	90.00	179.13	7,031.00	-6,026.89	-451.69	6,040.36	0.00	0.00	0.00	

Database:	Local	Local Co-ordinate Reference:	Well Westerman A5-736
Company:	Noble Energy	TVD Reference:	KB @ 4845.00usft
Project:	Cummins	MD Reference:	KB @ 4845.00usft
Site:	AB Section 32	North Reference:	Grid
Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,100.00	90.00	179.13	7,031.00	-6,126.88	-450.17	6,140.20	0.00	0.00	0.00
14,200.00	90.00	179.13	7,031.00	-6,226.87	-448.65	6,240.05	0.00	0.00	0.00
14,300.00	90.00	179.13	7,031.00	-6,326.86	-447.13	6,339.89	0.00	0.00	0.00
14,400.00	90.00	179.13	7,031.00	-6,426.84	-445.61	6,439.73	0.00	0.00	0.00
14,500.00	90.00	179.13	7,031.00	-6,526.83	-444.09	6,539.57	0.00	0.00	0.00
14,600.00	90.00	179.13	7,031.00	-6,626.82	-442.57	6,639.41	0.00	0.00	0.00
14,700.00	90.00	179.13	7,031.00	-6,726.81	-441.06	6,739.25	0.00	0.00	0.00
14,800.00	90.00	179.13	7,031.00	-6,826.80	-439.54	6,839.09	0.00	0.00	0.00
14,900.00	90.00	179.13	7,031.00	-6,926.79	-438.02	6,938.94	0.00	0.00	0.00
15,000.00	90.00	179.13	7,031.00	-7,026.78	-436.50	7,038.78	0.00	0.00	0.00
15,100.00	90.00	179.13	7,031.00	-7,126.76	-434.98	7,138.62	0.00	0.00	0.00
15,200.00	90.00	179.13	7,031.00	-7,226.75	-433.46	7,238.46	0.00	0.00	0.00
15,300.00	90.00	179.13	7,031.00	-7,326.74	-431.94	7,338.30	0.00	0.00	0.00
15,400.00	90.00	179.13	7,031.00	-7,426.73	-430.42	7,438.14	0.00	0.00	0.00
15,500.00	90.00	179.13	7,031.00	-7,526.72	-428.90	7,537.99	0.00	0.00	0.00
15,600.00	90.00	179.13	7,031.00	-7,626.71	-427.38	7,637.83	0.00	0.00	0.00
15,700.00	90.00	179.13	7,031.00	-7,726.69	-425.86	7,737.67	0.00	0.00	0.00
15,800.00	90.00	179.13	7,031.00	-7,826.68	-424.34	7,837.51	0.00	0.00	0.00
15,900.00	90.00	179.13	7,031.00	-7,926.67	-422.82	7,937.35	0.00	0.00	0.00
16,000.00	90.00	179.13	7,031.00	-8,026.66	-421.30	8,037.19	0.00	0.00	0.00
16,100.00	90.00	179.13	7,031.00	-8,126.65	-419.78	8,137.03	0.00	0.00	0.00
16,200.00	90.00	179.13	7,031.00	-8,226.64	-418.26	8,236.88	0.00	0.00	0.00
16,300.00	90.00	179.13	7,031.00	-8,326.63	-416.74	8,336.72	0.00	0.00	0.00
16,400.00	90.00	179.13	7,031.00	-8,426.61	-415.22	8,436.56	0.00	0.00	0.00
16,500.00	90.00	179.13	7,031.00	-8,526.60	-413.70	8,536.40	0.00	0.00	0.00
16,600.00	90.00	179.13	7,031.00	-8,626.59	-412.18	8,636.24	0.00	0.00	0.00
16,700.00	90.00	179.13	7,031.00	-8,726.58	-410.66	8,736.08	0.00	0.00	0.00
16,800.00	90.00	179.13	7,031.00	-8,826.57	-409.15	8,835.93	0.00	0.00	0.00
16,900.00	90.00	179.13	7,031.00	-8,926.56	-407.63	8,935.77	0.00	0.00	0.00
17,000.00	90.00	179.13	7,031.00	-9,026.54	-406.11	9,035.61	0.00	0.00	0.00
17,100.00	90.00	179.13	7,031.00	-9,126.53	-404.59	9,135.45	0.00	0.00	0.00
17,200.00	90.00	179.13	7,031.00	-9,226.52	-403.07	9,235.29	0.00	0.00	0.00
17,300.00	90.00	179.13	7,031.00	-9,326.51	-401.55	9,335.13	0.00	0.00	0.00
17,400.00	90.00	179.13	7,031.00	-9,426.50	-400.03	9,434.97	0.00	0.00	0.00
17,500.00	90.00	179.13	7,031.00	-9,526.49	-398.51	9,534.82	0.00	0.00	0.00
17,600.00	90.00	179.13	7,031.00	-9,626.48	-396.99	9,634.66	0.00	0.00	0.00
17,618.82	90.00	179.13	7,031.00	-9,645.29	-396.70	9,653.45	0.00	0.00	0.00

TD @ 17618.82' MD/7031.00' TVD - BHL-Westerman A5-736

Database:	Local	Local Co-ordinate Reference:	Well Westerman A5-736
Company:	Noble Energy	TVD Reference:	KB @ 4845.00usft
Project:	Cummins	MD Reference:	KB @ 4845.00usft
Site:	AB Section 32	North Reference:	Grid
Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL-Westerman A5-7 - plan hits target center - Point	0.00	0.01	0.00	0.00	0.00	1,439,069.87	3,258,883.16	40.534915	-104.568602
KOP-Westerman A5-7 - plan hits target center - Point	0.00	0.00	6,234.31	1,028.94	-465.16	1,440,098.81	3,258,418.00	40.537753	-104.570236
BHL-Westerman A5-7 - plan hits target center - Point	0.00	0.00	7,031.00	-9,645.29	-396.70	1,429,424.58	3,258,486.46	40.508452	-104.570393
TPZ-Westerman A5-7 - plan hits target center - Point	0.00	0.00	7,031.00	412.87	-549.56	1,439,482.74	3,258,333.61	40.536064	-104.570563

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
7,233.71	6,950.00	Nio B		0.00	
7,559.50	7,031.00	Nio C		0.00	

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,000.00	2,000.00	0.00	0.00	Build: 2°/100' @ 2000.00' MD
2,823.44	2,812.15	107.09	-48.42	Hold: 16.47° Inc, 335.67° Azm
6,392.01	6,234.31	1,028.94	-465.16	KOP: 9°/100' @ 6392.01' MD
7,559.50	7,031.00	412.87	-549.56	TPZ/LP: 7559.50' MD, 90.00° Inc, 179.13° Azm
17,618.82	7,031.00	-9,645.29	-396.70	TD @ 17618.82' MD/7031.00' TVD



Noble Energy

**Cummins
AB Section 32
Westerman A5-736**

**Wellbore #1
Plan #1**

Anticollision Summary Report

21 June, 2019



Anticollision Summary Report



Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum ellipse separation of 1,000.00 usft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	6/20/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	17,618.82	Plan #1 (Wellbore #1)	2_MWD+IFR1+MS	A008Mb: IFR dec & multi-station analysis

Summary						
Site Name Offset Well - Wellbore - Design	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)		
A Section 04						
BARRELL #41-4 (SI) - Wellbore #1 - No Surveys	13,024.27	7,036.00	6,046.88	5,713.23	18.123	CC
BARRELL #41-4 (SI) - Wellbore #1 - No Surveys	13,100.00	7,036.00	6,047.36	5,713.19	18.097	ES
BARRELL #41-4 (SI) - Wellbore #1 - No Surveys	13,700.00	7,036.00	6,084.52	5,746.45	17.998	SF
BARRELL #42-4 (PA) - Wellbore #1 - No Surveys	14,329.33	7,026.00	6,232.89	5,890.00	18.178	CC
BARRELL #42-4 (PA) - Wellbore #1 - No Surveys	14,400.00	7,026.00	6,233.29	5,889.90	18.152	ES
BARRELL #42-4 (PA) - Wellbore #1 - No Surveys	15,000.00	7,026.00	6,268.87	5,921.46	18.044	SF
DILLARD A #4-4 (SI) - Wellbore #1 - As-Drilled	13,193.50	6,939.36	2,258.89	2,181.49	29.183	CC
DILLARD A #4-4 (SI) - Wellbore #1 - As-Drilled	13,200.00	6,939.35	2,258.90	2,181.46	29.167	ES
DILLARD A #4-4 (SI) - Wellbore #1 - As-Drilled	13,500.00	6,938.76	2,279.59	2,200.59	28.856	SF
ERICKSON #14-4 (PR) - Wellbore #1 - No Surveys	17,339.92	7,051.00	2,521.21	2,154.03	6.866	CC, ES
ERICKSON #14-4 (PR) - Wellbore #1 - No Surveys	17,400.00	7,051.00	2,521.93	2,154.35	6.861	SF
ERICKSON #24-4 (PR) - Wellbore #1 - No Surveys	17,335.00	7,046.00	3,833.70	3,466.76	10.448	CC, ES
ERICKSON #24-4 (PR) - Wellbore #1 - No Surveys	17,600.00	7,046.00	3,842.85	3,474.16	10.423	SF
ERICKSON #34-4 (PR) - Wellbore #1 - As-Drilled	17,422.50	7,047.38	5,081.35	4,971.05	46.069	CC, ES
ERICKSON #34-4 (PR) - Wellbore #1 - As-Drilled	17,618.82	7,046.42	5,085.14	4,973.44	45.525	SF
ERICKSON A #4-12 (SI) - Wellbore #1 - No Surveys	15,832.52	7,046.00	2,309.62	1,954.43	6.503	CC, ES
ERICKSON A #4-12 (SI) - Wellbore #1 - No Surveys	15,900.00	7,046.00	2,310.60	1,954.99	6.497	SF
ERICKSON A #4-5 (PR) - Wellbore #1 - No Surveys	14,337.04	7,018.00	2,393.26	2,050.63	6.985	CC, ES
ERICKSON A #4-5 (PR) - Wellbore #1 - No Surveys	14,400.00	7,018.00	2,394.09	2,051.06	6.979	SF
LAWLEY #31-4 (PR) - Wellbore #1 - No Surveys	13,160.76	7,046.00	4,803.54	4,468.50	14.337	CC
LAWLEY #31-4 (PR) - Wellbore #1 - No Surveys	13,200.00	7,046.00	4,803.70	4,468.39	14.326	ES
LAWLEY #31-4 (PR) - Wellbore #1 - No Surveys	13,600.00	7,046.00	4,823.58	4,485.71	14.276	SF
LAWLEY #32-4(PR) - Wellbore #1 - No Surveys	14,275.22	7,046.00	4,729.00	4,385.71	13.776	CC
LAWLEY #32-4(PR) - Wellbore #1 - No Surveys	14,300.00	7,046.00	4,729.06	4,385.60	13.769	ES
LAWLEY #32-4(PR) - Wellbore #1 - No Surveys	14,700.00	7,046.00	4,748.04	4,401.96	13.720	SF
LAWLEY #33-4 (PR) - Wellbore #1 - No Surveys	16,047.50	7,056.00	5,113.03	4,755.78	14.312	CC
LAWLEY #33-4 (PR) - Wellbore #1 - No Surveys	16,100.00	7,056.00	5,113.30	4,755.67	14.297	ES
LAWLEY #33-4 (PR) - Wellbore #1 - No Surveys	16,500.00	7,056.00	5,133.02	4,772.70	14.246	SF
LAWLEY #43-4 (PR) - Wellbore #1 - No Surveys	16,030.74	7,036.00	6,250.33	5,894.00	17.541	CC
LAWLEY #43-4 (PR) - Wellbore #1 - No Surveys	16,100.00	7,036.00	6,250.71	5,893.88	17.517	ES
LAWLEY #43-4 (PR) - Wellbore #1 - No Surveys	16,700.00	7,036.00	6,286.06	5,925.16	17.418	SF
LAWLEY #44-4D (PR) - Wellbore #1 - As-Drilled	16,986.66	6,961.73	6,234.51	6,121.91	55.365	CC
LAWLEY #44-4D (PR) - Wellbore #1 - As-Drilled	17,000.00	6,961.75	6,234.53	6,121.82	55.317	ES
LAWLEY #44-4D (PR) - Wellbore #1 - As-Drilled	17,618.82	6,962.61	6,266.48	6,149.66	53.643	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
A Section 05						
DYER #13-5 (PA) - Wellbore #1 - As-Drilled	15,694.45	6,952.19	3,114.06	3,017.59	32.280	CC
DYER #13-5 (PA) - Wellbore #1 - As-Drilled	15,700.00	6,952.18	3,114.06	3,017.55	32.264	ES
DYER #13-5 (PA) - Wellbore #1 - As-Drilled	16,200.00	6,951.40	3,154.83	3,054.91	31.574	SF
DYER USX A #05-14 (PR) - Wellbore #1 - No Surveys	17,174.41	6,962.00	1,690.68	1,328.36	4.666	CC
DYER USX A #05-14 (PR) - Wellbore #1 - No Surveys	17,200.00	6,962.00	1,690.87	1,328.33	4.664	ES, SF
ERICKSON #5-43 (PR) - Wellbore #1 - No Surveys	17,129.07	6,979.00	502.86	140.22	1.387	Level 3, CC, ES, SF
GRADY DYER #14-5 (PA) - Wellbore #1 - No Surveys	17,170.82	6,941.00	3,194.98	2,833.54	8.839	CC
GRADY DYER #14-5 (PA) - Wellbore #1 - No Surveys	17,200.00	6,941.00	3,195.12	2,833.42	8.834	ES
GRADY DYER #14-5 (PA) - Wellbore #1 - No Surveys	17,400.00	6,941.00	3,203.19	2,839.96	8.819	SF
GRADY DYER #23-5 (PA) - Wellbore #1 - No Surveys	16,022.49	6,956.00	1,838.10	1,485.04	5.206	CC, ES
GRADY DYER #23-5 (PA) - Wellbore #1 - No Surveys	16,100.00	6,956.00	1,839.73	1,486.03	5.201	SF
OWL CREEK #7 (SI) - Wellbore #1 - No Surveys	15,784.44	7,013.00	979.66	626.17	2.771	CC, ES
OWL CREEK #7 (SI) - Wellbore #1 - No Surveys	15,800.00	7,013.00	979.78	626.21	2.771	SF
OWL CREEK #7-5 (SI) - Wellbore #1 - No Surveys	17,161.68	7,017.00	1,012.15	647.74	2.777	CC, ES, SF
ROUSE USX A #05-01 (SI) - Wellbore #1 - No Surveys	13,028.81	6,992.00	1,139.33	807.40	3.432	CC, ES, SF
ROUSE USX A #05-02 (SI) - Wellbore #1 - No Surveys	13,372.36	6,982.00	255.71	-78.31	0.766	Level 1, CC, ES, SF
ROUSE USX A #05-03 (SI) - Wellbore #1 - No Surveys	13,383.07	6,957.00	1,530.76	1,197.66	4.595	CC
ROUSE USX A #05-03 (SI) - Wellbore #1 - No Surveys	13,400.00	6,957.00	1,530.85	1,197.61	4.594	ES, SF
ROUSE USX A #05-04 (SI) - Wellbore #1 - As-Drilled	13,359.14	6,929.73	3,055.00	2,976.18	38.759	CC
ROUSE USX A #05-04 (SI) - Wellbore #1 - As-Drilled	13,400.00	6,928.31	3,055.28	2,976.14	38.606	ES
ROUSE USX A #05-04 (SI) - Wellbore #1 - As-Drilled	14,000.00	6,909.61	3,121.44	3,038.50	37.634	SF
ROUSE USX A #05-05 (SI) - Wellbore #1 - No Surveys	14,706.38	6,932.00	3,170.54	2,828.56	9.271	CC, ES
ROUSE USX A #05-05 (SI) - Wellbore #1 - No Surveys	14,900.00	6,932.00	3,176.44	2,832.95	9.248	SF
ROUSE USX A #05-06 (SI) - Wellbore #1 - As-drilled	14,734.26	6,978.43	1,501.08	1,412.01	16.853	CC, ES
ROUSE USX A #05-06 (SI) - Wellbore #1 - As-drilled	14,900.00	6,977.92	1,510.20	1,419.98	16.739	SF
ROUSE USX A #05-07 (SI) - Wellbore #1 - No Surveys	14,716.27	6,988.00	341.02	-3.28	0.990	Level 1, CC, ES, SF
ROUSE USX A #05-08 (SI) - Wellbore #1 - No Surveys	14,707.19	7,012.00	982.19	637.00	2.845	CC, ES, SF
ROUSE-USX A #5-17 (SI) - Wellbore #1 - As-Drilled	13,903.83	7,001.24	522.31	439.35	6.296	CC, ES, SF
ROUSE-USX A #5-19 (SI) - Wellbore #1 - No Surveys	13,873.94	6,945.00	2,411.67	2,075.43	7.172	CC
ROUSE-USX A #5-19 (SI) - Wellbore #1 - No Surveys	13,900.00	6,945.00	2,411.81	2,075.35	7.168	ES
ROUSE-USX A #5-19 (SI) - Wellbore #1 - No Surveys	14,000.00	6,945.00	2,414.96	2,077.73	7.161	SF
A Section 08						
ERICKSON A #8-1(PR) - Wellbore #1 - No Surveys	17,618.82	7,017.00	1,255.97	906.65	3.595	CC, ES, SF
ERICKSON A #8-17(PR) - Wellbore #1 - No Surveys	17,618.82	7,023.00	1,620.86	1,299.83	5.049	CC, ES, SF
ERICKSON A #8-2 - Wellbore #1 - No Surveys	17,618.82	6,998.00	952.43	628.25	2.938	CC, ES, SF
ERICKSON A #8-7(PR) - Wellbore #1 - No Surveys	17,618.82	6,997.00	2,185.88	1,876.36	7.062	CC, ES, SF
ERICKSON A #8-8(PR) - Wellbore #1 - No Surveys	17,618.82	7,035.00	2,436.38	2,105.77	7.369	CC, ES, SF
FRANCEN #23-8(PR) - Wellbore #1 - No Surveys	17,618.82	6,971.00	4,175.59	3,851.42	12.881	CC, ES, SF
FRANCEN #24-8(PR) - Wellbore #1 - No Surveys	17,618.82	6,962.00	5,267.97	4,952.82	16.716	CC, ES, SF
FRANCIS #11-8(SI) - Wellbore #1 - No Surveys	17,618.82	6,946.00	3,301.81	2,938.99	9.101	CC, ES, SF
FRANCIS #21-8(SI) - Wellbore #1 - No Surveys	17,618.82	6,966.00	1,991.12	1,630.60	5.523	CC, ES, SF
FRANCIS #22-8(SI) - Wellbore #1 - No Surveys	17,618.82	6,971.00	3,033.94	2,698.08	9.033	CC, ES, SF
GRADY #1(DA) - Wellbore #1 - No Surveys	17,618.82	6,955.00	3,857.36	3,507.30	11.019	CC, ES, SF
MILE HIGH SHEEP #8-32(PR) - Wellbore #1 - No Surveys	17,618.82	6,957.00	4,923.74	4,585.70	14.566	CC, ES, SF
MILE HIGH SHEEP #8-33(SI) - Wellbore #1 - As-Drilled	17,618.82	6,900.00	5,582.75	5,507.10	73.799	CC, ES, SF
MILE-HI SHEEP #8-35(PR) - Wellbore #1 - No Surveys	17,618.82	6,965.00	4,950.55	4,620.97	15.021	CC, ES, SF
UHRICH #33-8(PA) - Wellbore #1 - As-Drilled	17,618.82	6,949.15	3,683.95	3,630.33	68.704	CC, ES, SF
UHRICH #34-8(PA) - Wellbore #1 - No Surveys	17,618.82	6,959.00	5,082.67	4,775.07	16.524	CC, ES, SF
UHRICH #43-8(PR) - Wellbore #1 - No Surveys	17,618.82	7,016.00	3,868.82	3,549.40	12.112	CC, ES, SF
UHRICH #44-8(PR) - Wellbore #1 - NO Surveys	17,618.82	6,987.00	5,163.03	4,849.64	16.475	CC, ES, SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Anticollision Summary Report



Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
A Section 09						
HOWARD LAKE #11-9(SI) - Wellbore #1 - No Surveys	17,618.82	7,036.00	2,458.97	2,097.09	6.795	CC, ES, SF
HOWARD LAKE #12-9(SI) - Wellbore #1 - No Surveys	17,618.82	7,046.00	3,097.84	2,748.56	8.869	CC, ES, SF
HOWARD LAKE #21-9(SI) - Wellbore #1 - No Surveys	17,618.82	7,076.00	3,642.64	3,274.59	9.897	CC, ES, SF
HOWARD LAKE #41-9(PA) - Wellbore #1 - No Surveys	17,618.82	7,036.00	6,481.28	6,113.18	17.608	CC, ES, SF
HOWARD LAKE #42-9(SI) - Wellbore #1 - No Surveys	17,618.82	7,036.00	6,772.59	6,407.68	18.560	CC, ES, SF
Howard USX #A09-09D - Wellbore #1 - As-Drilled	17,618.82	7,100.00	7,160.02	7,047.82	63.812	CC, ES, SF
Howard USX #A09-14D - Wellbore #1 - As-Drilled	17,618.82	7,354.69	6,039.78	5,936.57	58.521	CC, ES, SF
Howard USX #A09-15D(PR) - Wellbore #1 - As-Drilled	17,618.82	6,944.93	6,860.01	6,764.21	71.613	CC, ES, SF
Howard USX #A09-23(SI) - Wellbore #1 - No Surveys	17,618.82	7,033.00	7,089.21	6,734.19	19.968	CC, ES, SF
HOWARD USX A #09-02D(PR) - Wellbore #1 - As-Drilled	17,618.82	7,400.00	4,909.97	4,768.63	34.737	CC, ES, SF
HOWARD USX A #09-06D(SI) - Wellbore #1 - As-Drilled	17,618.82	7,161.14	4,294.44	4,192.52	42.135	CC, ES, SF
HOWARD USX A #09-19(SI) - Wellbore #1 - As-Drilled	17,618.82	7,074.70	3,346.88	3,244.08	32.558	CC, ES, SF
HOWARD USX A #9-10(PR) - Wellbore #1 - No Surveys	17,618.82	7,040.00	6,022.24	5,666.65	16.936	CC, ES, SF
HOWARD USX A #9-11(PR) - Wellbore #1 - As-Drilled	17,618.82	6,825.53	4,981.02	4,889.14	54.216	CC, ES, SF
HOWARD USX A #9-13 - Wellbore #1 - As-Drilled	17,618.82	6,900.00	5,430.98	5,359.65	76.144	CC, ES, SF
HOWARD USX A #9-16 - Wellbore #1 - As-Drilled	17,618.82	7,000.00	7,900.04	7,804.03	82.286	CC, ES, SF
HOWARD USX A #9-7(PA) - Wellbore #1 - As-Drilled	17,618.82	7,100.00	5,558.12	5,448.19	50.562	CC, ES, SF
OWL CREEK #5(PA) - Wellbore #1 - No Surveys	17,618.82	7,043.00	6,243.20	5,874.62	16.939	CC, ES, SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
AB Section 28						
Gable A4-735 - Wellbore #1 - Plan #1	1,908.72	1,943.72	2,471.73	2,458.39	185.233	CC
Gable A4-735 - Wellbore #1 - Plan #1	2,000.00	2,000.00	2,471.98	2,458.11	178.202	ES
Gable A4-735 - Wellbore #1 - Plan #1	17,618.82	18,080.14	5,250.79	5,071.46	29.281	SF
Gable A4-745 - Wellbore #1 - Plan #1	1,907.92	1,943.92	2,486.14	2,472.80	186.344	CC
Gable A4-745 - Wellbore #1 - Plan #1	2,000.00	2,000.00	2,486.40	2,472.53	179.243	ES
Gable A4-745 - Wellbore #1 - Plan #1	17,618.82	17,725.44	4,595.18	4,416.02	25.648	SF
Gable A4-756 - Wellbore #1 - Plan #1	1,907.92	1,943.92	2,501.03	2,487.69	187.640	CC
Gable A4-756 - Wellbore #1 - Plan #1	2,000.00	2,000.00	2,501.29	2,487.42	180.316	ES
Gable A4-756 - Wellbore #1 - Plan #1	17,618.82	17,606.27	3,938.14	3,759.25	22.014	SF
Gable A4-766 - Wellbore #1 - Plan #1	2,248.15	2,283.84	2,516.37	2,500.60	159.532	CC
Gable A4-766 - Wellbore #1 - Plan #1	2,700.00	2,729.06	2,517.47	2,498.50	132.742	ES
Gable A4-766 - Wellbore #1 - Plan #1	17,618.82	17,426.26	3,282.80	3,104.36	18.397	SF
Gable A4-776 - Wellbore #1 - Plan #1	2,507.93	2,542.27	2,531.82	2,514.20	143.706	CC
Gable A4-776 - Wellbore #1 - Plan #1	17,618.82	17,485.32	2,625.45	2,447.08	14.719	ES, SF
HOFFNER #1(PA) - HOFFNER #1 - As-Drilled	3,817.99	3,748.72	2,055.51	2,029.07	77.724	CC
HOFFNER #1(PA) - HOFFNER #1 - As-Drilled	4,100.00	4,024.54	2,057.01	2,028.53	72.218	ES
HOFFNER #1(PA) - HOFFNER #1 - As-Drilled	7,050.00	6,847.27	2,265.23	2,216.22	46.225	SF
MOJACK #1-28(PR) - MOJACK #1-28 - No Surveys	6,450.57	6,346.08	7,620.26	7,469.51	50.549	CC
MOJACK #1-28(PR) - MOJACK #1-28 - No Surveys	6,500.00	6,394.73	7,621.36	7,469.45	50.172	ES
MOJACK #1-28(PR) - MOJACK #1-28 - No Surveys	7,200.00	6,987.83	7,845.82	7,680.66	47.503	SF
MOJACK #2-28(PR) - MOJACK #2-28 - No Surveys	6,472.22	6,357.33	6,554.26	6,403.18	43.385	CC
MOJACK #2-28(PR) - MOJACK #2-28 - No Surveys	6,500.00	6,384.73	6,554.65	6,402.93	43.201	ES
MOJACK #2-28(PR) - MOJACK #2-28 - No Surveys	7,100.00	6,918.33	6,741.40	6,577.72	41.185	SF
Mojack #I-28HN (SI) - Mojack #I-28HN - As-Drilled	6,594.71	11,657.49	4,359.24	4,249.47	39.714	CC
Mojack #I-28HN (SI) - Mojack #I-28HN - As-Drilled	6,600.00	11,657.92	4,359.24	4,249.44	39.702	ES
Mojack #I-28HN (SI) - Mojack #I-28HN - As-Drilled	6,800.00	11,666.00	4,364.46	4,253.90	39.477	SF
Mojack #J-28HN(SI) - Mojack #J-28HN - As-Drilled	6,612.87	11,650.00	4,678.69	4,569.04	42.670	CC, ES
Mojack #J-28HN(SI) - Mojack #J-28HN - As-Drilled	6,900.00	11,650.00	4,688.29	4,577.81	42.434	SF
Mojack #K-28HN (SI) - Mojack #K-28HN - As-Drilled	6,539.87	11,603.00	4,997.82	4,888.93	45.898	CC
Mojack #K-28HN (SI) - Mojack #K-28HN - As-Drilled	6,550.00	11,603.00	4,997.83	4,888.89	45.876	ES
Mojack #K-28HN (SI) - Mojack #K-28HN - As-Drilled	6,900.00	11,603.00	5,012.04	4,901.90	45.510	SF
Mojack #L-28HN (PR) - Mojack #L-28HN - As-Drilled	6,484.41	11,601.00	5,336.47	5,227.45	48.952	CC
Mojack #L-28HN (PR) - Mojack #L-28HN - As-Drilled	6,500.00	11,601.00	5,336.49	5,227.39	48.913	ES
Mojack #L-28HN (PR) - Mojack #L-28HN - As-Drilled	6,950.00	11,601.00	5,358.55	5,247.82	48.393	SF
Mojack #M-28HN (PR) - Mojack #M-28HN - As-Drilled	11,958.70	16,797.98	5,714.37	5,494.44	25.982	CC
Mojack #M-28HN (PR) - Mojack #M-28HN - As-Drilled	12,100.00	16,917.00	5,714.51	5,491.51	25.626	ES
Mojack #M-28HN (PR) - Mojack #M-28HN - As-Drilled	12,600.00	16,917.00	5,738.28	5,512.66	25.433	SF
MOJACK #N-28HC (PR) - MOJACK #N-28HC OH - As-C	6,539.32	11,233.20	6,161.75	6,060.76	61.015	CC
MOJACK #N-28HC (PR) - MOJACK #N-28HC OH - As-C	6,550.00	11,232.99	6,161.77	6,060.72	60.982	ES
MOJACK #N-28HC (PR) - MOJACK #N-28HC OH - As-C	7,500.00	12,174.00	6,213.15	6,093.93	52.115	SF
MOJACK #N-28HC (PR) - MOJACK #N-28HC ST01 - As	6,421.62	12,331.00	6,038.65	5,921.76	51.664	CC
MOJACK #N-28HC (PR) - MOJACK #N-28HC ST01 - As	12,100.00	17,021.12	6,115.76	5,892.73	27.422	ES
MOJACK #N-28HC (PR) - MOJACK #N-28HC ST01 - As	12,800.00	17,023.00	6,158.28	5,931.17	27.115	SF
Mojack #O-28HN (PR) - Mojack #O-28HN - As-Drilled	11,969.92	16,797.00	6,401.33	6,181.29	29.092	CC
Mojack #O-28HN (PR) - Mojack #O-28HN - As-Drilled	12,000.00	16,797.00	6,401.40	6,181.11	29.060	ES
Mojack #O-28HN (PR) - Mojack #O-28HN - As-Drilled	12,800.00	16,797.00	6,454.92	6,229.62	28.650	SF
Mojack #P-28HN (PR) - Mojack #P-28HN - As-Drilled	12,075.41	17,043.00	6,712.74	6,489.96	30.132	CC
Mojack #P-28HN (PR) - Mojack #P-28HN - As-Drilled	12,100.00	17,043.00	6,712.79	6,489.79	30.103	ES
Mojack #P-28HN (PR) - Mojack #P-28HN - As-Drilled	13,000.00	17,043.00	6,776.12	6,547.01	29.575	SF
Mojack AB30-615 - Wellbore #1 - Plan #1	7,052.10	12,256.00	205.86	120.83	2.421	CC, ES
Mojack AB30-615 - Wellbore #1 - Plan #1	7,100.00	12,259.60	213.08	121.78	2.334	SF
Mojack AB30-625 - Wellbore #1 - Plan #1	6,839.01	11,934.35	726.10	635.00	7.970	CC
Mojack AB30-625 - Wellbore #1 - Plan #1	6,850.00	11,935.51	726.28	634.84	7.943	ES

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
AB Section 28						
Mojack AB30-625 - Wellbore #1 - Plan #1	6,900.00	11,940.62	731.53	638.74	7.884	SF
Mojack AB30-635 - Wellbore #1 - Plan #1	6,745.52	11,729.58	1,334.93	1,242.68	14.472	CC
Mojack AB30-635 - Wellbore #1 - Plan #1	6,750.00	11,730.08	1,334.95	1,242.64	14.462	ES
Mojack AB30-635 - Wellbore #1 - Plan #1	6,800.00	11,735.58	1,338.35	1,245.34	14.390	SF
Mojack AB30-645 - Wellbore #1 - Plan #1	6,706.83	11,635.56	1,975.54	1,883.28	21.412	CC, ES
Mojack AB30-645 - Wellbore #1 - Plan #1	6,800.00	11,645.92	1,984.49	1,891.27	21.287	SF
Mojack AB30-655 - Wellbore #1 - Plan #1	6,668.51	11,570.51	2,607.75	2,515.11	28.151	CC, ES
Mojack AB30-655 - Wellbore #1 - Plan #1	6,800.00	11,585.25	2,624.48	2,530.74	27.996	SF
Mojack AB30-665 - Wellbore #1 - Plan #1	6,659.56	11,623.66	3,262.96	3,170.39	35.248	CC, ES
Mojack AB30-665 - Wellbore #1 - Plan #1	6,800.00	11,639.44	3,281.31	3,187.59	35.012	SF
Mojack AB30-675 - Wellbore #1 - Plan #1	6,643.52	11,746.84	3,908.91	3,815.80	41.980	CC
Mojack AB30-675 - Wellbore #1 - Plan #1	6,650.00	11,747.59	3,908.95	3,815.78	41.955	ES
Mojack AB30-675 - Wellbore #1 - Plan #1	6,800.00	11,764.48	3,931.06	3,836.72	41.670	SF
Mojack AB30-685 - Wellbore #1 - Plan #1	6,636.26	11,883.95	4,521.86	4,428.77	48.575	CC, ES
Mojack AB30-685 - Wellbore #1 - Plan #1	6,800.00	11,902.25	4,545.64	4,451.28	48.175	SF
RICH #3-28(TA) - RICH #3-28 - No Surveys	6,493.78	6,371.58	5,548.15	5,396.70	36.634	CC
RICH #3-28(TA) - RICH #3-28 - No Surveys	6,500.00	6,377.73	5,548.17	5,396.58	36.599	ES
RICH #3-28(TA) - RICH #3-28 - No Surveys	7,000.00	6,840.13	5,692.00	5,530.01	35.136	SF
RICH #4-28(SI) - RICH #4-28 - No Surveys	6,517.52	6,372.07	4,803.54	4,652.02	31.701	CC
RICH #4-28(SI) - RICH #4-28 - No Surveys	6,550.00	6,404.30	4,804.27	4,651.99	31.548	ES
RICH #4-28(SI) - RICH #4-28 - No Surveys	6,950.00	6,777.69	4,926.89	4,766.24	30.670	SF
ROBEL #12-28(PR) - ROBEL #12-28 - As-Drilled	6,464.31	6,434.19	2,729.11	2,680.70	56.374	CC, ES
ROBEL #12-28(PR) - ROBEL #12-28 - As-Drilled	6,800.00	6,757.40	2,779.32	2,728.96	55.190	SF
ROBEL #14-28(PR) - ROBEL #14-28 - As-Drilled	776.82	793.82	2,851.49	2,847.52	718.829	CC
ROBEL #14-28(PR) - ROBEL #14-28 - As-Drilled	1,000.00	994.97	2,852.29	2,846.80	518.859	ES
ROBEL #14-28(PR) - ROBEL #14-28 - As-Drilled	7,400.00	7,182.06	3,655.82	3,601.49	67.287	SF
Robel #19-28(PR) - Robel #19-28 - No Surveys	5,785.86	5,660.03	2,698.70	2,564.34	20.085	CC
Robel #19-28(PR) - Robel #19-28 - No Surveys	6,400.00	6,248.98	2,704.33	2,555.78	18.206	ES
Robel #19-28(PR) - Robel #19-28 - No Surveys	6,950.00	6,769.69	2,795.39	2,634.88	17.416	SF
Weld County #16-28(PR) - Weld County #16-28 - No Surveys	2,000.00	2,026.99	5,943.59	5,896.11	125.190	CC
Weld County #16-28(PR) - Weld County #16-28 - No Surveys	2,300.00	2,326.44	5,946.87	5,892.34	109.054	ES
Weld County #16-28(PR) - Weld County #16-28 - No Surveys	7,450.00	7,048.66	6,400.33	6,233.82	38.438	SF
Weld County #20-28(SI) - Weld County #20-28 - As-Drilled	4,153.10	4,484.24	5,494.06	5,456.31	145.551	CC
Weld County #20-28(SI) - Weld County #20-28 - As-Drilled	4,200.00	4,513.99	5,494.16	5,456.13	144.458	ES
Weld County #20-28(SI) - Weld County #20-28 - As-Drilled	7,250.00	7,181.35	5,734.95	5,679.41	103.249	SF
Weld County #9-28(PR) - Weld County #9-28 - As-Drilled	903.87	939.99	5,938.31	5,933.38	1,206.057	CC, ES
Weld County #9-28(PR) - Weld County #9-28 - As-Drilled	7,000.00	7,115.70	6,495.07	6,436.67	111.203	SF



Anticollision Summary Report



Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
AB Section 29						
DILLARD - USX AB #29-17(SI) - DILLARD - USX AB #29	6,554.37	6,424.20	3,540.57	3,494.17	76.306	CC, ES
DILLARD - USX AB #29-17(SI) - DILLARD - USX AB #29	6,800.00	6,646.49	3,587.65	3,539.82	75.007	SF
Dillard USX #AB29-02(SI) - Dillard USX #AB29-02 - As-C	6,561.07	6,421.27	4,357.69	4,201.54	27.907	CC, ES
Dillard USX #AB29-02(SI) - Dillard USX #AB29-02 - As-C	6,900.00	6,752.28	4,446.65	4,283.63	27.278	SF
DILLARD USX AB #29-7(SI) - DILLARD USX AB #29-7 -	6,571.30	6,428.54	2,963.00	2,916.66	63.934	CC, ES
DILLARD USX AB #29-7(SI) - DILLARD USX AB #29-7 -	6,750.00	6,599.99	2,987.98	2,940.54	62.990	SF
FAULKNER-USX AB #29-14(SI) - FAULKNER-USX AB #	6,878.31	6,627.09	1,832.12	1,784.17	38.212	CC
FAULKNER-USX AB #29-14(SI) - FAULKNER-USX AB #	6,900.00	6,646.56	1,832.22	1,784.16	38.125	ES
FAULKNER-USX AB #29-14(SI) - FAULKNER-USX AB #	7,150.00	6,832.27	1,851.90	1,802.83	37.739	SF
FAULKNER-USX AB #29-25(SI) - FAULKNER-USX AB #	6,737.14	6,517.88	2,591.69	2,436.93	16.746	CC
FAULKNER-USX AB #29-25(SI) - FAULKNER-USX AB #	6,750.00	6,530.12	2,591.75	2,436.71	16.717	ES
FAULKNER-USX AB #29-25(SI) - FAULKNER-USX AB #	7,050.00	6,784.09	2,625.90	2,465.22	16.342	SF
FAULKNER-USX AB #29-6(SI) - FAULKNER-USX AB #2	6,609.04	6,478.10	3,319.30	3,153.50	20.020	CC
FAULKNER-USX AB #29-6(SI) - FAULKNER-USX AB #2	6,650.00	6,524.19	3,320.43	3,153.38	19.877	ES
FAULKNER-USX AB #29-6(SI) - FAULKNER-USX AB #2	6,700.00	6,579.96	3,324.88	3,156.33	19.726	SF
HEINZE - USX AB #29-10(PR) - HEINZE - USX AB #29-	6,575.58	6,414.51	1,592.49	1,439.52	10.411	CC
HEINZE - USX AB #29-10(PR) - HEINZE - USX AB #29-	6,600.00	6,438.73	1,592.95	1,439.39	10.373	ES
HEINZE - USX AB #29-10(PR) - HEINZE - USX AB #29-	6,750.00	6,584.92	1,615.91	1,458.84	10.288	SF
HEINZE #44-29(PR) - HEINZE #44-29 - No Surveys	4,863.77	4,743.76	1,010.63	898.21	8.989	CC
HEINZE #44-29(PR) - HEINZE #44-29 - No Surveys	5,200.00	5,066.20	1,015.12	894.95	8.448	ES
HEINZE #44-29(PR) - HEINZE #44-29 - No Surveys	6,900.00	6,696.01	1,159.07	1,000.22	7.297	SF
HEINZE USX AB #29-09D(PR) - HEINZE USX AB #29-0	1,336.43	1,317.14	1,546.43	1,537.47	172.579	CC, ES
HEINZE USX AB #29-09D(PR) - HEINZE USX AB #29-0	6,650.00	6,874.07	1,755.36	1,704.75	34.684	SF
HEINZE USX AB #29-15(PR) - HEINZE USX AB #29-15	6,686.69	6,502.08	454.57	407.90	9.740	CC, ES
HEINZE USX AB #29-15(PR) - HEINZE USX AB #29-15	6,750.00	6,563.01	456.50	409.45	9.704	SF
OWL CREEK #13(SI) - OWL CREEK #13 - No Surveys	6,610.63	6,420.46	5,145.10	4,992.67	33.752	CC, ES
OWL CREEK #13(SI) - OWL CREEK #13 - No Surveys	7,050.00	6,810.09	5,267.31	5,106.22	32.697	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
AB Section 32						
CECIL #32-32 (PR) - Wellbore #1 - No Surveys	10,768.23	6,955.00	2,780.35	2,465.07	8.818	CC
CECIL #32-32 (PR) - Wellbore #1 - No Surveys	10,800.00	6,955.00	2,780.53	2,465.04	8.813	ES
CECIL #32-32 (PR) - Wellbore #1 - No Surveys	10,900.00	6,955.00	2,783.47	2,467.33	8.804	SF
CECIL #32-34 (PR) - Wellbore #1 - No Surveys	11,905.67	6,960.00	1,860.09	1,537.31	5.763	CC, ES
CECIL #32-34 (PR) - Wellbore #1 - No Surveys	12,000.00	6,960.00	1,862.48	1,539.00	5.758	SF
LAW #1 (PA) - Wellbore #1 - No Surveys	10,604.47	6,955.00	1,680.67	1,366.35	5.347	CC, ES
LAW #1 (PA) - Wellbore #1 - No Surveys	10,700.00	6,955.00	1,683.38	1,368.44	5.345	SF
LEY #1-32(PA) - LEY #1-32 - No Surveys	7,989.84	6,976.99	2,960.68	2,795.30	17.902	CC, ES
LEY #1-32(PA) - LEY #1-32 - No Surveys	8,100.00	6,976.99	2,962.73	2,797.19	17.897	SF
MCCRORY #1 (DA) - Wellbore #1 - No Surveys	2,000.00	1,970.00	812.40	726.66	9.476	CC
MCCRORY #1 (DA) - Wellbore #1 - No Surveys	2,100.00	2,069.98	814.14	724.05	9.037	ES
MCCRORY #1 (DA) - Wellbore #1 - No Surveys	4,200.00	4,100.00	1,320.10	1,141.22	7.380	SF
NC Farms #10-32 (SI) - Wellbore #1 - As-Drilled	10,400.00	7,456.23	467.06	387.34	5.858	SF
NC Farms #10-32 (SI) - Wellbore #1 - As-Drilled	10,487.26	7,457.01	458.84	380.78	5.878	CC, ES
NC Farms #15-32(SI) - Wellbore #1 - As-Drilled	11,913.58	7,163.86	353.90	282.63	4.966	CC, ES, SF
NC Farms #16-32(PR) - Wellbore #1 - As-Drilled	11,882.28	7,044.72	973.90	904.04	13.942	CC, ES
NC Farms #16-32(PR) - Wellbore #1 - As-Drilled	11,900.00	7,045.25	974.06	904.13	13.929	SF
NC Farms #20-32 (SI) - Wellbore #1 - As-Drilled	11,263.57	7,164.74	323.63	252.44	4.546	CC, ES, SF
NC Farms #9-32 (SI) - Wellbore #1 - As-Drilled	10,614.01	7,312.46	941.42	866.60	12.582	CC, ES, SF
SCOTT #32-13 (SI) - Wellbore #1 - No Surveys	9,460.21	6,980.00	522.43	213.05	1.689	CC, ES, SF
SCOTT #32-14 (PR) - Wellbore #1 - No Surveys	9,132.83	7,005.00	1,133.05	824.02	3.666	CC, ES, SF
WESTERMAN #32-11 (SI) - Wellbore #1 - No Surveys	2,598.05	2,559.71	243.31	131.87	2.183	CC
WESTERMAN #32-11 (SI) - Wellbore #1 - No Surveys	2,800.00	2,755.64	248.15	128.16	2.068	ES
WESTERMAN #32-11 (SI) - Wellbore #1 - No Surveys	2,900.00	2,851.57	255.22	131.04	2.055	SF
Westerman A4-786 - Wellbore #1 - Plan #1	2,375.49	2,361.34	108.72	92.29	6.618	CC
Westerman A4-786 - Wellbore #1 - Plan #1	2,400.00	2,384.79	108.79	92.21	6.560	ES
Westerman A4-786 - Wellbore #1 - Plan #1	2,500.00	2,479.85	111.02	93.81	6.454	SF
Westerman A5-716 - Wellbore #1 - Plan #1	2,211.68	2,206.01	72.84	57.51	4.749	CC
Westerman A5-716 - Wellbore #1 - Plan #1	2,300.00	2,292.02	73.22	57.29	4.597	ES
Westerman A5-716 - Wellbore #1 - Plan #1	2,400.00	2,388.95	75.24	58.67	4.540	SF
Westerman A5-726 - Wellbore #1 - Plan #1	2,000.00	1,999.00	37.50	23.63	2.704	CC
Westerman A5-726 - Wellbore #1 - Plan #1	2,200.00	2,196.38	38.09	22.83	2.496	ES
Westerman A5-726 - Wellbore #1 - Plan #1	2,300.00	2,294.97	39.28	23.34	2.465	SF
Westerman A5-745 - Wellbore #1 - Plan #1	2,000.00	1,999.00	37.50	23.63	2.704	CC
Westerman A5-745 - Wellbore #1 - Plan #1	2,100.00	2,099.96	37.83	23.25	2.594	ES
Westerman A5-745 - Wellbore #1 - Plan #1	2,300.00	2,301.81	40.50	24.52	2.533	SF



Anticollision Summary Report



Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

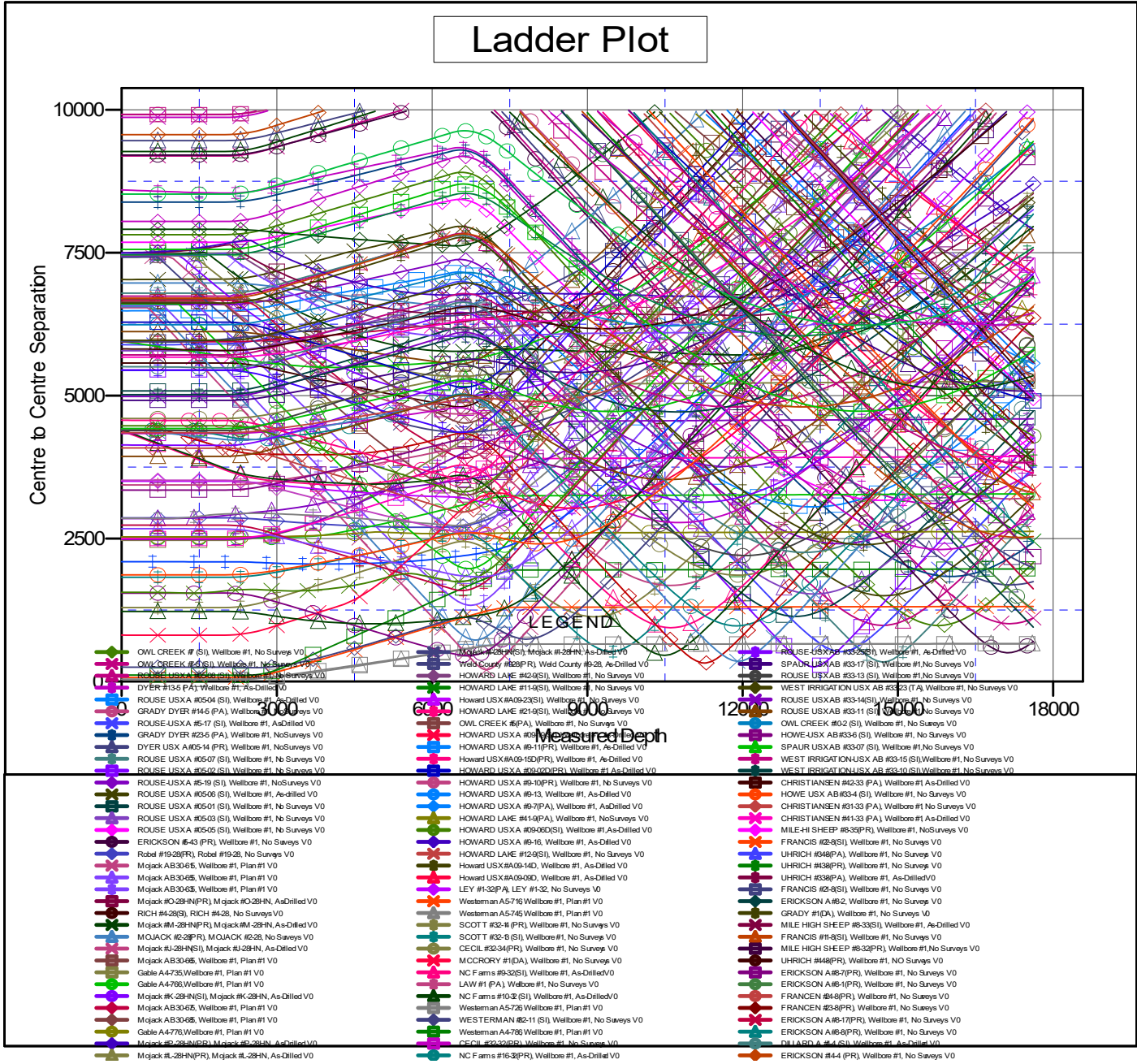
Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
AB Section 33						
CHRISTIANSEN #31-33 (PA) - Wellbore #1 - No Surveys	2,000.00	2,025.00	4,353.18	4,265.24	49.504	CC
CHRISTIANSEN #31-33 (PA) - Wellbore #1 - No Surveys	2,300.00	2,324.45	4,359.49	4,258.51	43.172	ES
CHRISTIANSEN #31-33 (PA) - Wellbore #1 - No Surveys	8,100.00	7,056.00	4,897.58	4,589.36	15.890	SF
CHRISTIANSEN #41-33 (PA) - Wellbore #1 - As-Drilled	0.00	21.41	5,673.91			
CHRISTIANSEN #41-33 (PA) - Wellbore #1 - As-Drilled	2,100.00	2,157.54	5,676.26	5,661.57	386.313	ES
CHRISTIANSEN #41-33 (PA) - Wellbore #1 - As-Drilled	11,200.00	7,112.59	7,072.95	7,011.74	115.558	SF
CHRISTIANSEN #42-33 (PA) - Wellbore #1 - As-Drilled	2,066.09	2,170.32	5,789.99	5,775.38	396.424	CC
CHRISTIANSEN #42-33 (PA) - Wellbore #1 - As-Drilled	2,100.00	2,205.18	5,790.10	5,775.26	389.942	ES
CHRISTIANSEN #42-33 (PA) - Wellbore #1 - As-Drilled	12,200.00	6,978.60	6,805.89	6,739.03	101.784	SF
HOWE USX AB #33-4 (SI) - Wellbore #1 - No Surveys	2,000.00	1,990.00	1,867.11	1,780.57	21.576	CC
HOWE USX AB #33-4 (SI) - Wellbore #1 - No Surveys	2,300.00	2,289.45	1,874.07	1,774.49	18.820	ES
HOWE USX AB #33-4 (SI) - Wellbore #1 - No Surveys	8,100.00	7,021.00	2,408.52	2,101.69	7.850	SF
HOWE-USX AB #33-6 (SI) - Wellbore #1 - No Surveys	2,000.00	2,012.00	3,349.62	3,262.20	38.318	CC
HOWE-USX AB #33-6 (SI) - Wellbore #1 - No Surveys	2,200.00	2,211.84	3,354.40	3,258.28	34.897	ES
HOWE-USX AB #33-6 (SI) - Wellbore #1 - No Surveys	9,300.00	7,043.00	3,700.83	3,389.68	11.894	SF
OWL CREEK #10-2 (SI) - Wellbore #1 - No Surveys	10,568.50	7,052.00	6,223.26	5,905.27	19.571	CC
OWL CREEK #10-2 (SI) - Wellbore #1 - No Surveys	10,600.00	7,052.00	6,223.34	5,905.18	19.560	ES
OWL CREEK #10-2 (SI) - Wellbore #1 - No Surveys	11,200.00	7,052.00	6,255.22	5,933.69	19.455	SF
ROUSE USX AB #33-11 (SI) - Wellbore #1 - No Surveys	10,545.79	7,034.00	3,532.72	3,215.58	11.139	CC, ES
ROUSE USX AB #33-11 (SI) - Wellbore #1 - No Surveys	10,700.00	7,034.00	3,536.08	3,218.14	11.122	SF
ROUSE USX AB #33-13 (SI) - Wellbore #1 - No Surveys	12,045.01	7,009.00	2,203.68	1,877.99	6.766	CC, ES
ROUSE USX AB #33-13 (SI) - Wellbore #1 - No Surveys	12,100.00	7,009.00	2,204.36	1,878.36	6.762	SF
ROUSE USX AB #33-14(SI) - Wellbore #1 - No Surveys	11,794.57	7,033.00	3,754.69	3,429.74	11.555	CC
ROUSE USX AB #33-14(SI) - Wellbore #1 - No Surveys	11,800.00	7,033.00	3,754.70	3,429.71	11.553	ES
ROUSE USX AB #33-14(SI) - Wellbore #1 - No Surveys	12,000.00	7,033.00	3,760.31	3,434.12	11.528	SF
ROUSE-USX AB #33-25(SI) - Wellbore #1 - As-Drilled	11,201.14	6,968.64	3,137.19	3,073.29	49.095	CC, ES
ROUSE-USX AB #33-25(SI) - Wellbore #1 - As-Drilled	11,900.00	6,989.99	3,214.01	3,146.54	47.637	SF
SPAUR USX AB #33-07 (SI) - Wellbore #1 - No Surveys	2,000.00	2,032.00	4,426.34	4,338.12	50.176	CC
SPAUR USX AB #33-07 (SI) - Wellbore #1 - No Surveys	2,200.00	2,231.84	4,431.07	4,334.15	45.718	ES
SPAUR USX AB #33-07 (SI) - Wellbore #1 - No Surveys	9,700.00	7,063.00	4,730.38	4,416.67	15.079	SF
SPAUR USX AB #33-17 (SI) - Wellbore #1 - No Surveys	2,000.00	2,028.00	4,917.60	4,829.54	55.846	CC
SPAUR USX AB #33-17 (SI) - Wellbore #1 - No Surveys	2,200.00	2,227.84	4,921.32	4,824.55	50.860	ES
SPAUR USX AB #33-17 (SI) - Wellbore #1 - No Surveys	9,000.00	7,059.00	5,411.66	5,101.02	17.421	SF
WEST IRRIGATION USX AB #33-23 (TA) - Wellbore #1 -	11,225.99	7,060.00	5,551.75	5,229.43	17.225	CC, ES
WEST IRRIGATION USX AB #33-23 (TA) - Wellbore #1 -	11,800.00	7,060.00	5,581.34	5,255.63	17.136	SF
WEST IRRIGATION-USX AB #33-10 (SI) - Wellbore #1 -	10,769.76	7,055.00	4,716.49	4,397.19	14.771	CC
WEST IRRIGATION-USX AB #33-10 (SI) - Wellbore #1 -	10,800.00	7,055.00	4,716.59	4,397.12	14.764	ES
WEST IRRIGATION-USX AB #33-10 (SI) - Wellbore #1 -	11,200.00	7,055.00	4,736.07	4,414.38	14.723	SF
WEST IRRIGATION-USX AB #33-15 (SI) - Wellbore #1 -	11,787.67	7,043.00	4,803.35	4,478.04	14.766	CC
WEST IRRIGATION-USX AB #33-15 (SI) - Wellbore #1 -	11,800.00	7,043.00	4,803.36	4,477.98	14.762	ES
WEST IRRIGATION-USX AB #33-15 (SI) - Wellbore #1 -	12,200.00	7,043.00	4,821.01	4,493.19	14.706	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 4845.00usft
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000

Coordinates are relative to: Westerman A5-736
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.60°



Company:	Noble Energy	Local Co-ordinate Reference:	Well Westerman A5-736
Project:	Cummins	TVD Reference:	KB @ 4845.00usft
Reference Site:	AB Section 32	MD Reference:	KB @ 4845.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Westerman A5-736	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Local
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 4845.00usft
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000

Coordinates are relative to: Westerman A5-736
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.60°

